WE CLAIM AS OUR INVENTION:

1. An imaging tomography apparatus comprising:

a first data acquisition system comprising a first radiator and a first detector for detecting radiation originating from said first radiator;

a second data acquisition system comprising a second radiator and a second detector for detecting radiation originating from said second radiator;

a gantry to which said first data acquisition system and said second data acquisition system are mounted for rotation around a common rotation axis; and

during rotation around said common rotation axis, said first data acquisition system and said second data acquisition system respectively scanning maximum measurement fields that differ in size from each other.

2. An imaging tomography apparatus as claimed in claim 1 wherein said first radiator is a first x-ray radiator, said first detector is a first detector is a first x-ray detector, said second radiator is a second x-ray radiator and said second detector is a second x-ray detector, and wherein said first data acquisition system generates a first set of computed tomography projection data, and wherein said second data acquisition system generates a second set of computed tomography projection data.

3. An imaging tomography apparatus as claimed in claim 1 wherein said first radiator emits a radiation beam having a maximum fan angle and wherein said second radiator emits a radiation beam having a maximum fan angle, the maximum fan angle of said first radiation beam being different from the maximum fan angle of the second radiation beam.

4. An imaging tomography apparatus as claimed in claim 1 wherein said first detector has a first length measured in an azimuthal direction relative to said common rotation axis, and wherein said second detector has a second length measured in said azimuthal direction, said first length and said second lengths being different.

5. An imaging tomography apparatus as claimed in claim 1 wherein each of said first data acquisition system and said second data acquisition system is adapted to scan a patient, said patient having a body cross-section, and wherein said maximum measurement field of said first data acquisition system has a size for scanning an entirety of said body cross-section of the patient, and wherein said maximum measurement field of said second data acquisition system has a size for scanning only a part of said body cross-section of the patient.

6. An imaging tomography apparatus as claimed in claim 5 wherein said maximum measurement field of said second data acquisition system has a size for scanning only a part of said body cross-section of said patient containing the heart.

7. An imaging tomography apparatus as claimed in claim 1 wherein each of said first detector and said second detector is comprised of a plurality of detector elements disposed in succession in an azimuthal direction relative to said common rotation axis, and wherein the detector elements of said first detector have an element separation between successive detector elements that is equal to an element separation between the respective detector elements of the second detector.

8. An imaging tomography apparatus as claimed in claim 7 wherein said first radiator has a first focus from which radiation from said first radiator emanates, and wherein said second radiator has a second focus from which radiation from said

second radiator emanates, and wherein said first data acquisition system and said second data acquisition system are mounted so that, when said first and second data acquisition systems are rotated to cause a line proceeding from said first focus to said common rotation axis to occupy a previous position of a line proceeding between said second focus and said common rotation axis, at least some of the detector elements of the first detector are displaced by a displacement angle relative to respective locations of at least some of the detector elements of the second detector at said previous position.

9. An imaging tomography apparatus as claimed in claim 8 wherein each detector element of said first detector exhibits a first angular position, measured from said line proceeding between said first focus and said common rotation axis and a line proceeding between said first focus and that detector element of the first detector, and wherein each detector element of said second detector exhibits a second angular position, measured between said line proceeding between said second focus and said common rotation axis and a line proceeding between said second focus and that detector element of the second detector, and wherein a difference between said first angular position and said angular position is a whole-number, odd multiple of ½ of said element separation.

10. An imaging tomography apparatus as claimed in claim 1 wherein said first data acquisition system and said second data acquisition system are mounted in a common plane.

11. An imaging tomography apparatus as claimed in claim 1 wherein said first data acquisition system and said second data acquisition are mounted so as to be separated from each other, in respective planes, along said common rotation axis.

12. An imaging tomography apparatus as claimed in claim 1 wherein at least one of said first and second data acquisition systems is mounted so as to be movable relative to the other of said first and second data acquisition systems along said common rotation axis, to cause said first and second data acquisition systems to be respectively disposed in different planes.

13. An imaging tomography apparatus as claimed in claim 1 wherein one of said first and second data systems has a larger maximum measurement field and the other of said first and second data acquisition systems has a smaller maximum measurement field, and comprising an operating unit, connected to said first and second data acquisition systems, for allowing a selection to be made between a first scanning mode with said larger maximum measurement field and a second scanning mode with said smaller maximum measurement field.

14. An imaging tomography apparatus as claimed in claim 13 wherein said operating unit, in said first scanning mode, deactivates the data acquisition system having said smaller maximum measurement field.

15. An imaging tomography apparatus as claimed in claim 13 wherein, in said second scanning mode, said operating unit activates both said first and second data acquisition systems.

16. An imaging tomography apparatus as claimed in claim 13 wherein each of said first and second data acquisition systems generates raw data, and comprising a computer supplied with said raw data for reconstructing an image therefrom, and wherein said computer is connected to said operating unit and reconstructs said image differently dependent on whether said first scanning mode or said second scanning mode is selected.

17. An imaging tomography apparatus as claimed in claim 16 wherein said computer, in at least one of said first and second scanning modes, reconstructs a single image using the raw data from both of said first and second data acquisition systems.

18. An imaging tomography apparatus comprising:

a first data acquisition system comprising a first radiator and a first detector for detecting radiation originating from said first radiator for scanning a first measurement field;

a second data acquisition system comprising a second radiator and a second detector for detecting radiation originating from said second radiator for scanning a second measurement field;

a gantry to which said first data acquisition system and said second data acquisition system are mounted for rotation around a common rotation axis; and

a setting arrangement for, during rotation around said rotation axis, setting the measurement field for at least one of said first data acquisition system and said second data acquisition system so that the respective measurement fields differ in size from each other.

19. An imaging tomography apparatus as claimed in claim 18 wherein said first radiator is a first x-ray radiator, said first detector is a first detector is a first x-ray detector, said second radiator is a second x-ray radiator and said second detector is a second x-ray detector, and wherein said first data acquisition system generates a first set of computed tomography projection data, and wherein said second data acquisition system generates a second set of computed tomography projection data.

20. An imaging tomography apparatus as claimed in claim 18 wherein said first radiator emits a radiation beam having a fan angle and wherein said second radiator emits a radiation beam having a fan angle, the fan angle of said first radiation beam being different from the fan angle of the second radiation beam.

21. An imaging tomography apparatus as claimed in claim 18 wherein said first detector has a first length measured in an azimuthal direction, and wherein said second detector has a second length measured in said azimuthal direction, said first length and said second lengths being different.

22. An imaging tomography apparatus as claimed in claim 18 wherein each of said first data acquisition system and said second data acquisition system is adapted to scan a patient, said patient having a body cross-section, and wherein said measurement field of said first data acquisition system has a size for scanning an entirety of said body cross-section of the patient, and wherein said measurement field of said second data acquisition system has a size for scanning only a part of said body cross-section of the patient.

23. An imaging tomography apparatus as claimed in claim 22 wherein said measurement field of said second data acquisition system has a size for scanning only a part of said body cross-section of said patient containing the heart.

24. An imaging tomography apparatus as claimed in claim 18 wherein each of said first detector and said second detector is comprised of a plurality of detector elements disposed in succession in an azimuthal direction relative to said common rotation axis, and wherein the detector elements of said first detector have an element separation between successive detector elements that is equal to an element separation between the respective detector elements of the second detector.

25. An imaging tomography apparatus as claimed in claim 24 wherein said first radiator has a first focus from which radiation from said first radiator emanates, and wherein said second radiator has a second focus from which radiation from said second radiator emanates, and wherein said first data acquisition system and said second data acquisition system are mounted so that, when said first and second data acquisition systems are rotated to cause a line proceeding from said first focus to said common rotation axis to occupy a previous position of a line proceeding between said second focus and said common rotation axis, at least some of the detector elements of the first detector are displaced by a displacement angle relative to respective locations of at least some of the detector elements of the second detector at said previous position.

26. An imaging tomography apparatus as claimed in claim 25 wherein each detector element of said first detector exhibits a first angular position, measured from said line proceeding between said first focus and said common rotation axis and a line proceeding between said first focus and that detector element of the first detector, and wherein each detector element of said second detector exhibits a second angular position, measured between said line proceeding between said second focus and said common rotation axis and a line proceeding between said second focus and that detector element of the second detector, and wherein a difference between said first angular position and said angular position is a whole-number, odd multiple of ½ of said element separation.

27. An imaging tomography apparatus as claimed in claim 18 wherein said first data acquisition system and said second data acquisition system are mounted in a common plane.

28. An imaging tomography apparatus as claimed in claim 18 wherein said first data acquisition system and said second data acquisition are mounted so as to be separated from each other, in respective planes, along said common rotation axis.

29. An imaging tomography apparatus as claimed in claim 18 wherein at least one of said first and second data acquisition systems is mounted so as to be movable relative to the other of said first and second data acquisition systems along said common rotation axis, to cause said first and second data acquisition systems to be respectively disposed in different planes.

30. An imaging tomography apparatus as claimed in claim 18 wherein one of said first and second data acquisition systems has a larger maximum measurement field and the other of said first and second data acquisition systems has a smaller maximum measurement field, and wherein said setting arrangement is associated with said one of said data acquisition systems having said larger maximum measurement field, and is disposed to interact with said larger maximum measurement field to reduce said larger maximum measurement field to form said measurement field of said one of said data acquisition systems, so that said measurement field of said one of said data acquisition systems does not overlap said measurement field of said other of said data acquisition systems.

31. An imaging tomography apparatus as claimed in claim 30 wherein said setting arrangement is a gating device disposed to interact with said radiation originating from the radiator of said one of said data acquisition systems having said larger maximum measurement field, to set and reduce a fan angle of said radiation.

32. An imaging tomography apparatus as claimed in claim 31 wherein said gating device has movable diaphragm plates, movable toward and away from each other, to selectively set said fan angle.

33. An imaging tomography apparatus as claimed in claim 30 wherein said setting arrangement is a filter device.

34. An imaging tomography apparatus as claimed in claim 33 wherein said filter device comprises a plurality of filters selectively introducible into said radiation, said plurality of filters respectively having differing radiation transparencies in a region of said measurement field of one of said data acquisition systems which does not overlap with said measurement field of said other of said data acquisition systems.

35. An imaging tomography apparatus as claimed in claim 18 wherein one of said first and second data systems has a larger measurement field and the other of said first and second data acquisition systems has a smaller measurement field, and comprising an operating unit, connected to said first and second data acquisition systems, for allowing a selection to be made between a first scanning mode with said larger measurement field and a second scanning mode with said smaller measurement field.

36. An imaging tomography apparatus as claimed in claim 35 wherein said operating unit, in said first scanning mode, deactivates the data acquisition system having said smaller measurement field.

37. An imaging tomography apparatus as claimed in claim 35 wherein, in said second scanning mode, said operating unit activates both said first and second data acquisition systems.

38. An imaging tomography apparatus as claimed in claim 35 wherein each of said first and second data acquisition systems generates raw data, and comprising a computer supplied with said raw data for reconstructing an image therefrom, and wherein said computer is connected to said operating unit and reconstructs said image differently dependent on whether said first scanning mode or said second scanning mode is selected.

39. An imaging tomography apparatus as claimed in claim 38 wherein said computer, in at least one of said first and second scanning modes, reconstructs a single image using the raw data from both of said first and second data acquisition systems.